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REMARKS

The present response is intended to be fully responsive to all points of objection and/or rejection raised by the Examiner and is believed to place the application in condition for allowance. Favorable reconsideration and allowance of the application is respectfully requested.

Applicants assert that the present invention is new, non-obvious and useful. Prompt consideration and allowance of the claims is respectfully requested.

Status of Claims

Claims 1, 2, and 4-18 are pending.

Claims 1, 2 and 4-18 have been rejected.

Claim 1 has been amended in this submission. Applicants respectfully assert that the amendment to the claim adds no new matter.

The Telephone Interview

Initially, Applicants wish to thank Examiner An for granting and conducting the telephone interview with Applicants' Representative, Guy Yonay, Reg. No. 52,388 on November 23, 2009. In the interview, claim 1 was discussed, with reference to the Westhaver reference.

CLAIM REJECTIONS

35 U.S.C. § 103 Rejections

In the Office Action, the Examiner rejected claims 1, 2 and 4-18 under 35 U.S.C. § 103(a), as being unpatentable over Westhaver (U.S. Patent No. 5,719,715) in view of Lai (U.S. Patent No. 6,470,097). Applicants respectfully traverse the rejection at least for the following reasons:

Westhaver discloses a filter (typically used on a camera lens when acquiring images) for underwater color correction, wherein the filter is characterized by optical transmission exhibiting more attenuation of blue/green light than red light and having a ratio of transmission at 600 nanometers and 700 nanometers substantially less than 50%.

First, Westhaver deals only with image degradation caused by relative attenuation, i.e., by differential attenuation (the difference between attenuation of blue/green portion of the spectrum with respect to attenuation of the red portion of the spectrum). Westhaver does not deal with absolute attenuation.

Moreover, Westhaver is not concerned with other degradation effects in underwater imaging. Specifically, Westhaver does not deal with the degradation effect of veiling light.

Finally, Westhaver deals with conventional (film) photography and uses filters in the process of producing prints. Westhaver, therefore, does not disclose a method of image processing, for example, using a “physics-based mathematical model” as recited in claim 1.

Lai – which deals with blur – does not rectify these deficiencies of the Westhaver reference. Lai discloses a blind image restoration system that uses total variational (TV) regularization to allow discontinuities in a true image function. The system first updates image blur parameters to minimize the energy function with the motion parameters and restored image. The motion parameters between subsequent frames in the image sequence are then updated to minimize the energy function with the blur parameters and restored image. The restored image is then updated by using a preconditioned conjugate gradient algorithm to minimize the energy function derived from the TV regularization formulation. The TV-based energy function is then computed by using the currently updated parameter values. If the relative difference between the current energy function value and the energy value computed in the previous iteration is within a threshold, then it is converged and the restored image is outputted. If it is not converged, the signal flows back to update the parameters.

According to embodiments of the present invention, information on the attenuation and veiling light effect on parts of the scene is derived from the image (or images) acquired. Reference is drawn to paragraphs [0076]-[0079] of the present application and to formula (27), pertaining to veiling light and formula (29), pertaining to attenuation.

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Applicants assert that neither Westhaver nor Lai, alone or in combination, teaches or suggests an image processing method for enhancing underwater imaging affected by image degradation effects that includes "determining attenuation of parts of the scene as acquired by the imaging device and determining the contribution of veiling light to said acquired at least one image, the attenuation and contribution of veiling light derived from said at least one image" and "reconstructing an image of the underwater scene using a physics-based mathematical model, compensating image characteristics influenced by the attenuation and the veiling light degradation effects, and compensating underwater degradation effects relating to the optical path between illumination sources and different parts of the scene", as claimed in independent claim 1 and the corresponding system claim, independent claim 17.

Therefore, the combination of Westhaver and Lai does not teach or suggest all the limitations of independent claim 1 and independent claim 17. Applicants respectfully traverse the rejection because a prima facie case of obviousness has not been established. Accordingly, Applicants respectfully assert that claims 1 and 17 are allowable.

Claims 2, 4-7 and 11-16 depend from, directly or indirectly, claims 1 or 17, and therefore include all the limitations of one of these claims. Therefore, Applicants respectfully assert that claims 2, 4-7 and 11-16 are likewise allowable. Accordingly, Applicants respectfully request that the Examiner withdraw the rejections to amended independent claims 1 and 17 and to claims 2, 4-7 and 11-16 dependent thereon.

In the Office Action, the Examiner rejected claims 8-10 under 35 U.S.C. § 103(a), as being unpatentable over Westhaver (U.S. Patent No. 5,719,715) and Lai, et al. (U.S. Patent No. 6,470,097) as applied to claim 1 and further view of Auty, et al. (U.S. Patent No. 5,809,161). Applicants respectfully traverse this rejection at least for the following reasons.

Auty et al. discloses an object monitoring system that includes a camera node for monitoring movement of an object to determine an acquisition time when an image of the object is to be acquired and acquiring the image at the predetermined time. The system includes a camera which is able to monitor moving objects and image processing circuitry, responsive to the camera, which is able to detect a predetermined moving object from other moving and static objects. From the image acquired, information identifying the object can be

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automatically extracted. A second camera may also be used to acquire the image, and in some embodiments of that invention the second camera operates in higher resolution than the resolution of the monitoring camera.

The allowability of independent claim 1 was discussed above. Auty et al. does not rectify the deficiencies of claim 1, as the combination of Westhaver, Lai et al. and Auty et al. does not teach or suggest all the limitations of independent claim 1.

Claims 8-10 depend from, directly or indirectly, independent claim 1, and therefore include all the limitations of one of that claim. Therefore, Applicants respectfully assert that claims 8-10 are likewise allowable. Accordingly, Applicants respectfully request that the Examiner withdraw the rejections to claims 8-10.

In the Office Action, the Examiner rejected claim 18 under 35 U.S.C. § 103(a), as being unpatentable over Westhaver (U.S. Patent No. 5,719,715) and Lai et al. (U.S. Patent No. 6,470,097) as applied to claim 1 and further view of Feldman et al. (U.S. Patent No. 6,267,051). Applicants respectfully traverse this rejection at least for the following reasons.

Feldman et al. disclosed a method and system for printing a customer image order containing at least one image captured underwater. A digital record of a customer image order containing at least one image captured underwater is obtained. The image captured underwater is determined and a level of correction is also determined. The digital record of the underwater captured image is modified in the determined manner. The determination of the existence of an image captured underwater may be provided by analyzing the image record or obtained by reading information received from the customer image order. Thereafter modified image may be printed and/or displayed.

The allowability of independent claim 1 was discussed above. Feldman et al. does not rectify the deficiencies of claim claim 1, as the combination of Westhaver, Lai et al. and Feldman et al. does not teach or suggest all the limitations of independent claim 1.

Claim 18 depends from independent claim 1, and therefore includes all the limitations of one of that claim. Therefore, Applicants respectfully assert that claim 18 is likewise

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allowable. Accordingly, Applicants respectfully request that the Examiner withdraw the rejections to claim 18.

Conclusion

In view of the foregoing amendments and remarks, Applicants assert that the pending claims are allowable. Their favorable reconsideration and allowance is respectfully requested.

Should the Examiner have any question or comment as to the form, content or entry of this Amendment, the Examiner is requested to contact the undersigned at the telephone number below. Similarly, if there are any further issues yet to be resolved to advance the prosecution of this application to issue, the Examiner is requested to telephone the undersigned counsel.

Please charge any fees associated with this paper to deposit account No. 50-3355.

Respectfully submitted,

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